

IV. DEMAND ESTIMATES AND PROJECTIONS

The water demands of urban and agricultural users are the topic of this chapter. Chapter III, Environmental Resources and Needs, addresses environmental needs for water.

OVERVIEW OF DEMAND ESTIMATES AND PROJECTIONS

This chapter presents the estimates and projections for the water demands of the Lower West Coast (LWC) Planning Area. For 1990, the South Florida Water Management District (SFWMD) estimated that total water demand for the LWC Planning Area was 307,061 million gallons for the year (MGY). Figure IV-1 shows the relative water demand by each category of use. As used in this document, *public water supply* refers to all potable water supplied by regional water treatment facilities to all types of customers, not just residential. The other four categories of water use identified in this document are self-supplied. *Commercial and industrial* refers to water that is self-supplied by commercial and industrial operations using over 100,000 gallons per day. *Recreation self supplied* includes landscape and recreational use demand and golf course irrigation demand. The golf course category includes only those operations which obtain water from their own irrigation wells. The landscape grouping includes water used for parks, cemeteries and other irrigation applications greater than 100,000 gallons a day. *Residential self-supplied* is used to designate only those households whose primary source of water are private wells. *Agriculture* includes water used to irrigate all crops, and for cattle watering.

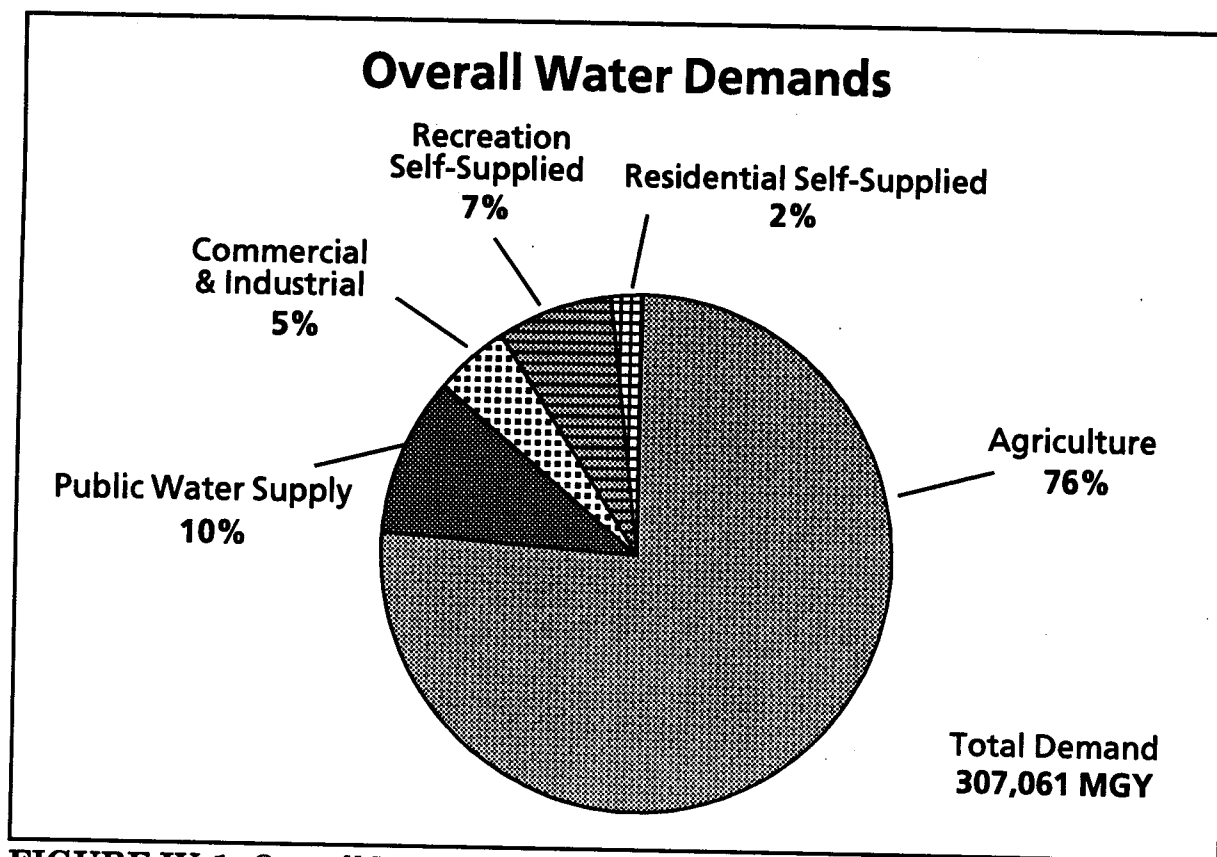


FIGURE IV-1. Overall Water Demands for 1990 in the LWC Planning Area.

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Table IV-1 identifies the water demand estimates for 1990, by category, as well as the projected demands for 2010. Figure IV-2 illustrates the relative growth in demand projected for each category from 1990 to 2010. During the 20-year period, overall water demand is projected to increase by 54 percent to 471,507 MGY. Public water supply has the largest projected increase of 97 percent. However, agricultural water demand is projected to remain the single largest category of use.

TABLE IV-1. Overall Water Demands for 1990 and 2010 in the LWC Planning Area (MGY).

Category	Estimated Demands 1990	Projected Demands 2010	% Change 1990-2010
Agriculture	234,636	334,644	43%
Public Water Supply	30,328	59,856	97%
Residential	5,026	7,465	49%
Commercial & Industrial	14,447	27,660	91%
Recreation	22,624	41,882	85%
TOTAL	307,061	471,507	54%

In 1990, agriculture accounted for 76 percent of the total demand. Agricultural demands are projected to increase by 43 percent by 2010, accounting for 71 percent of the total demand.

Charlotte, Glades (with the exception of one golf course), and Monroe counties were not included in the tables showing demands for urban water uses. Although portions of these counties are in the planning area, their demand for urban uses is small.

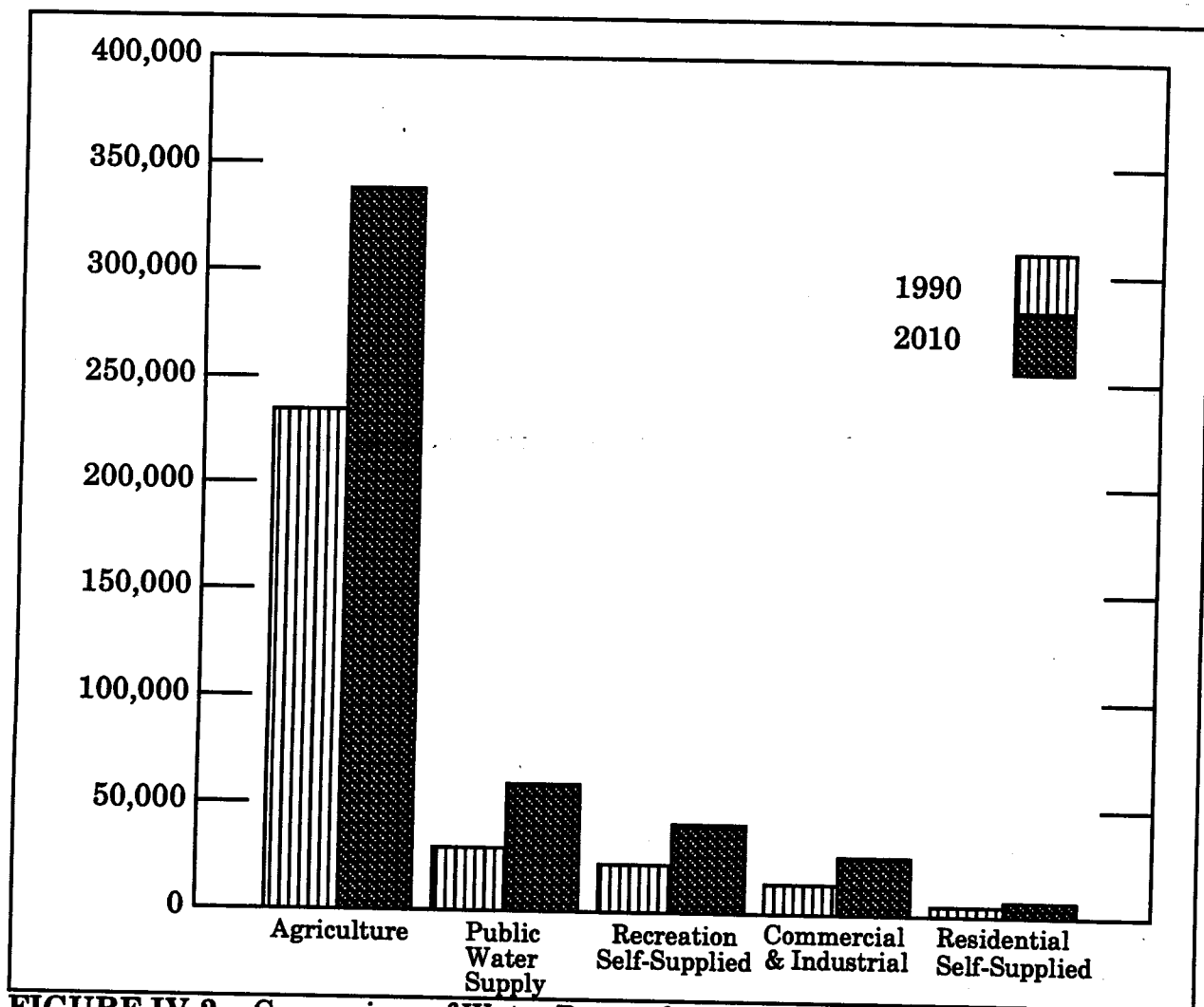


FIGURE IV-2. Comparison of Water Demands (MGY) for 1990 and 2010 in the LWC Planning Area.

URBAN DEMAND

Summary of Urban Demand

The five categories of urban water demand analyzed for this report include: (1) public water supply provided by utilities; (2) domestic self supply; (3) commercial and industrial self supply; (4) landscape and recreation; and (5) golf course. Urban water demand in 1990 is estimated to be approximately 73 billion gallons per year. Public water supply provided by utilities represents the largest component (41%) of urban water demand in 1990, followed by commercial and industrial self supply (20%), golf course irrigation (17%), landscape and recreation (14%), and domestic self supply (8%). Urban water demand is estimated to increase by a factor of approximately 1.9 to 137 billion gallons per year in 2010. The proportions of the urban demand components in the year 2010 are anticipated to be similar to the proportions in 1990.

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Public Water Supply and Domestic Self-Supplied

Public water supply and residential self-supplied demand projections were developed for the modeled areas of the LWC Planning Area for the period through 2010. Table IV-2 shows total demands for Collier, Hendry and Lee counties. More detail on specific utility service area populations and water demands are found in Appendix G. An overview of the methodology used to develop these values is also provided in the appendix.

TABLE IV-2. Public Water Supply and Residential Self-Supplied Estimates and Projections for the LWC Planning Area (MGD).

County	1990		2010	
	Utility Supplied	Residential Self Supplied	Utility Supplied	Residential Self Supplied
Collier County Area	36.7	4.6	71.3	8.4
Hendry County Area	3.9	1.7	6.2	2.7
Lee County	42.5	7.7	86.5	9.8
TOTAL	83.1	14.0	164.0	20.9

The total population of the LWC Planning Area for 1990 was 512,985. The total population is projected to increase by 90 percent to 975,595 in 2010. The estimated water demand for urban users was 97 million gallons per day (MGD) in 1990. Water demand is projected to increase 91 percent from 1990 to 2010 to a total water demand of 185 MGD.

Commercial and Industrial Self-Supplied

Included in the demand projections for this section are self-supplied commercial and industrial users. PWS supplied commercial and industrial demands are included with other PWS demands. The projection methodology and data sources are provided in Appendix G. Commercial and industrial demand projections for the LWC Planning Area are presented in Table IV-3. Hendry County's only significant industrial demands are supplied by a public utility.

TABLE IV-3. Commercial and Industrial Self-Supplied Demand in the LWC Planning Area (MGD).

County	1985	1990	1995	2000	2005	2010
Collier County Area	7.1	8.3	10.2	12.1	14.0	16.0
Lee County	18.7	31.3	38.8	46.2	53.0	59.8
TOTAL	25.8	39.6	49.0	58.4	67.0	75.8

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Recreation Self Supplied

Landscape and Recreational Use

Included in the demand projections for this section are individual permits for landscaping and recreation, excluding those for golf courses. The projection methodology and data sources are provided in Appendix G. Landscape and recreational self-supplied demand projections for the LWC Planning Area are presented in Table IV-4. Hendry County does not have any significant landscape and recreational self-supplied demand.

TABLE IV-4. Landscape and Recreational Self-Supplied Demand in the LWC Planning Area (MGD).

County	1985	1990	1995	2000	2005	2010
Collier County Area	2.8	4.0	4.9	5.9	6.8	7.8
Lee County	12.7	23.5	29.1	34.7	39.8	44.9
TOTAL	15.5	27.5	34.0	40.6	46.6	52.7

Note: Demand under average rainfall conditions.

Golf Course Irrigation Demand

Golf course irrigation requirement estimates (Table IV-5) were made by time horizon and month. Projection methodology and data sources are provided in Appendix G.

TABLE IV-5. Irrigation Requirements for the Primary Irrigated Golf Course Acreage Projection in the LWC Planning Area (MGD).

County	1985	1990	1995	2000	2005	2010
Collier County Area	13.8	16.5	20.5	24.2	28.6	32.7
Lee County	12.7	17.2	19.2	22.3	25.4	28.6
Hendry County Area	0.8	0.8	0.8	0.8	0.8	0.8
Glades County Area	0.1	0.1	0.1	0.1	0.1	0.1
TOTAL	27.4	34.6	40.6	47.6	54.9	62.2

Note: Demand under average rainfall conditions.

AGRICULTURAL WATER DEMAND

Summary of Agricultural Demand

The nine categories of agricultural water demand analyzed for this report include: (1) citrus; (2) citrus nursery; (3) sugarcane; (4) tropical fruit; (5) vegetables; (6) field crops; (7) sod; (8) ornamental nursery; and (9) cattle watering. Agricultural water demand in 1990 is estimated to be approximately 235 billion gallons per year. Approximately 92 percent of the 1990 agricultural water demand is for citrus (40%), sugarcane (35%), and vegetables (18%). Sod and ornamental nurseries each use approximately three percent of the total 1990 agricultural water demand. Field crops

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use represents approximately one percent of the 1990 agricultural water demand. The combined water demand for tropical fruit, cattle watering, and citrus nurseries is approximately one percent of the total 1990 agricultural water demand.

Agricultural water demand is forecast to increase by a factor of approximately 1.4 to 335 billion gallons per year in the year 2010. Approximately 94 percent of the agricultural water demand in the year 2010 is anticipated to be for citrus (50%), sugarcane (31%), and vegetables (13%). Sod and ornamental nurseries are each projected to represent approximately two percent of the total 2010 agricultural water demand. The projected water demands for citrus nursery, tropical fruit, field crops, and cattle watering are less than one percent each in the year 2010.

The LWC Planning Area continues to experience growth in irrigated agricultural acreage. The irrigated crops in this region are citrus, sugarcane, tropical fruit, vegetables, field crops, sod, and ornamental nursery. These crops are spreading onto land which was formerly pasture. Pasture is seldom irrigated in the LWC Planning Area, and when irrigation takes place, it is invariably in a period of extreme drought, and is done to prevent the grass from dying. There are, however, some requirements for cattle watering associated with the total pasture acreage. Descriptions of the agricultural acreage in each county, projection methodology, and the calculation of irrigation requirements, including data sources, are detailed in Appendix G.

Agricultural irrigation requirements are seasonal, especially for crops such as vegetables which are grown only at specific times of the year. This seasonality is misleadingly smoothed if the annual demands are averaged and presented as million gallons per day. Therefore, agricultural requirements are presented by month for each crop in each county, and the summations for the LWC Planning Area are presented as million gallons per year.

Table IV-6 shows the annual average agricultural irrigation demand by crop. Figure IV-3 presents a graphical comparison of agricultural demand by crop type for 1990 and 2010. During the 20-year period, agricultural water demand is projected to increase by 43 percent to 334,644 MGY. For a complete description of agricultural water demand by crop in individual counties, see Appendix G.

The actual and projected irrigation demands presented in this chapter are based on historical crop acreage data. These data were available on a county level, which for ground water modeling purposes, lack the resolution to identify problem areas. Therefore permit data, which show the locations of permitted withdrawals, were used in the modeling process because these data have the level of resolution required by the ground water models. This is further discussed in Chapter VI in the Demand Assumptions section.

Citrus

The LWC Planning Area has the fastest growing citrus acreage of any area in Florida. While acreage has grown continuously since 1966 (the first year for which data is available), the most significant increases have occurred since 1986, and are associated with the interregional movement of citrus acreage from Central to Southwest Florida following several severe freezes in the mid-1980s.

Citrus water demand is projected to remain the single largest category of use. In 1990, citrus accounted for 40 percent of the total agricultural demand. Citrus

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TABLE IV-6. Water Demands by Crop in the LWC Planning Area (MGY).

Category	Estimated Demands 1990	Projected Demands 2010	% Change 1990-2010
Citrus	93,871	167,692	79%
Citrus Nursery	176	283	61%
Sugarcane	81,567	105,377	29%
Tropical Fruit	1,765	2,410	37%
Vegetables	41,096	42,322	3%
Field Crops	2,256	2,256	0%
Sod	7,209	7,209	0%
Ornamental Nursery	6,142	6,579	7%
Cattle Watering	554	516	-7%
TOTAL	234,636	334,644	43%

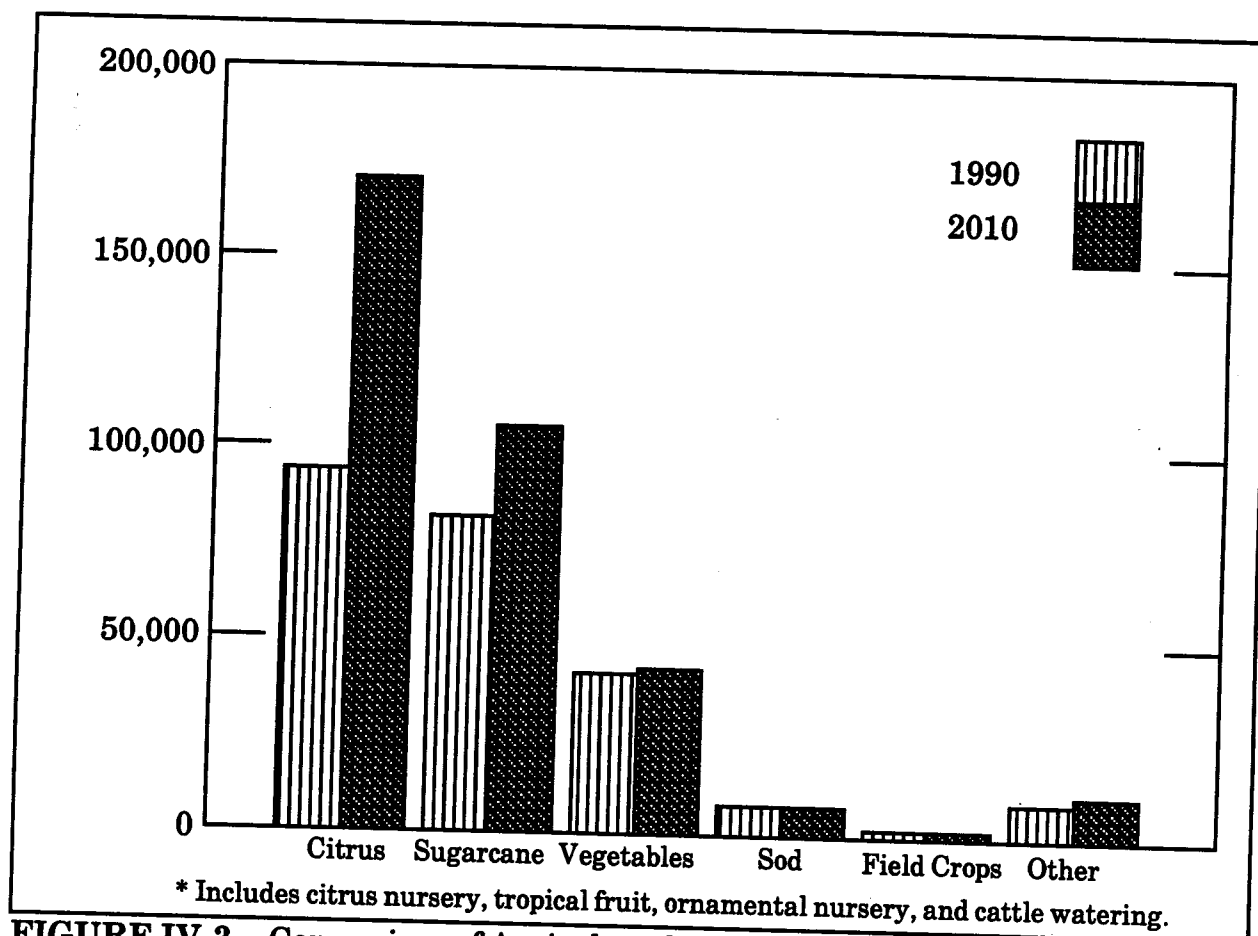


FIGURE IV-3. Comparison of Agricultural Demands for 1990 and 2010 in the LWC Planning Area (MGY).

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demands are projected to increase by 79 percent by 2010, accounting for 50 percent of the total agricultural demand.

Citrus acreage is projected to grow from 94,770 acres in 1990 to 186,255 acres in 2010. This growth in acreage represents an increase in average irrigation requirements from 93,871 MGY in 1990 to 167,692 MGY in 2010.

Citrus Nursery

Hendry is the only county in the LWC Planning Area with a significant citrus nursery acreage, and this is forecast to increase from 134 acres in 1990 to 344 acres in 2010. The associated increase in average irrigation requirements is from 176 MGY in 1990 to 283 MGY in 2010.

Sugarcane

Sugarcane is produced in Hendry and Glades counties. In 1990 there were 54,141 acres of sugarcane in the portion of these counties in the LWC Planning Area, and this is forecast to increase to 83,919 acres by the year 2010. Because of the production practices used for sugarcane (ratoon and fallow), there is roughly an additional 20 percent of land used for sugarcane production which is idle in any given year. The projected increase in sugarcane acreage represents a rise in average irrigation requirements from 81,567 MGY in 1990 to 105,377 MGY in 2010.

Tropical Fruit

Lee is the only county in the LWC Planning Area with significant tropical fruit acreage (other than citrus), and this is forecast to increase from 1,680 acres in 1990 to 2,680 acres in 2010. The associated increase in average irrigation requirements is from 1,765 MGY in 1990 to 2,410 MGY in 2010.

Vegetables

Vegetable crops grown in the LWC Planning Area include cucumbers, peppers, tomatoes, potatoes, watermelons, squash, eggplant, latin vegetables, sweet corn, snap beans, and cabbage. Different types of vegetables are often grown interchangeably, and in 1990, there were 49,276 acres of land used for vegetable production. This is projected to increase to 50,261 acres by 2010, and represents an increase in the average irrigation requirements from 41,096 MGY in 1990 to 42,322 MGY in 2010.

Field Crops

Field crop production in the LWC Planning Area is limited to the Charlotte County Area. This acreage varies from year to year based on the demand for seed corn, which in turn is primarily dependent on production in other parts of the country. This variation in production is more of a fluctuation than a real trend.

An agricultural commodity summary (1991) was developed for Charlotte County by the local Soil Conservation Service office at the request of the District. The summary reported 2,123 acres of seed corn production (1,423 acres in the spring and 700 acres in the fall) and 1,000 acres of soybeans (all in the spring). While fluctuations are anticipated, the magnitude of these acreages are typical. These combined acreages have irrigation requirements of 2,256 MGY.

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Sod

In 1990 there were a total of 4,268 acres of irrigated sod production in the LWC Planning Area. There is additional sod harvested from pasture land, but this is rarely irrigated. Sod production is projected to remain fairly constant through 2010, with associated average irrigation requirements of 7,209 MGY.

Ornamental Nursery

In 1990 there were 3,420 acres of ornamental nursery in the LWC Planning Area, and this is projected to increase to 5,060 acres by the year 2010. This represents an increase in average irrigation requirements from 6,579 MGY in 1990 to 6,994 MGY in 2010. The increase in irrigation demands is moderated by the District's higher irrigation efficiency permitting standards.

Cattle Watering

Although pasture is seldom irrigated in the LWC Planning Area, there is a demand for cattle watering and barn washing associated with cattle production (which is in turn associated with pasture acreage). This was assessed at 554 MGY in 1990, and is projected to decline slightly to 516 MGY in 2010. This decline is associated with the displacement of pastureland with irrigated agricultural crops (especially citrus).

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